National Aeronautics and Space Administration

Glenn Research Center is distinguished by its unique blend of aeronautics and space flight expertise and experience. As we move toward a greater focus on space flight hardware development, we are benefiting from our diverse accomplishments and expertise in aeronautics.

Visit Glenn at http://www.nasa.gov/centers/glenn/

NASA Glenn Research Center at Lewis Field

Achieving the Extraordinary

At our main campus near Cleveland, Ohio, our scientists and engineers investigate space operations, aerospace technology, and technologies needed for space exploration: power, propulsion, communications, fluids and combustion, materials, structures, mechanical components, and instrumentation and controls. At our Plum Brook Station in Sandusky, Ohio, our scientists and engineers perform very large and hazardous aerospace tests in one-of-a-kind facilities.

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Space Flight Research and Development

- **In-Space Propulsion and Nuclear Systems**—research and development of electrical (solar array and ion thruster), nuclear, and chemical (alternative propellants, combustion chamber cooling, and combustion modeling) propulsion systems
- **Fluids, Combustion, and Reacting Subsystems, Including Gravity Dependence**—cryogenic propellant management and characterization and in situ resource utilization on the Moon and Mars
- **Systems Integration and Analysis**—mission analysis, flight trajectory modeling and analysis, and cost and technology assessment
- **Human Research**—exercise hardware and diagnostic instrumentation, modeling, and systems to evaluate and maintain astronaut health with little or no real-time support from Earth
- **Microgravity Science**—fluid physics (including life-support fluids, in situ resource utilization, and thermal and fluid management processes), combustion science and fire safety, materials science, bioscience, and acceleration measurement and analysis

Aeronautics Research and Development

- **Advanced Turbine Engine Propulsion and Power Systems**—compressor, combustor, and high- and low-pressure turbine technology
- **Turbine Engine Noise Reduction**—fan and exhaust system technology
- **Propulsion Control and Engine Health Management**—active control, advanced diagnostics, and distributed control
- **Instrumentation Systems**—optical flow and temperature measurement in high-temperature environments, and nondestructive evaluation
- **Avionics**—avionics, hybrid power, and communications systems; electrical power distribution and control; and electromagnetic interference
- **Aircraft Icing Research**—research, education, and partnering for safer flight
- **Modeling and Simulation**—engines and ceramic components; flow and heat transfer; aerodynamic problems, aging, and failure; and ice accretion and effects
- **Alternative Fuel Systems**—hydrogen-powered aircraft and propulsion and power systems

Research and Development That Advances Both Aeronautics and Space

- **Power and Energy-Conversion Systems**—fuel cells and solar cells to generate power (including Brayton and Stirling systems); fuel cells, batteries, and flywheels to store energy; and electrical power distribution and control
- **Aircraft, Spacecraft, and Planetary Communications**—communications architectures, systems, subsystems, and components; systems to extend the Internet into space; orbital coverage; and link performance, network, and interference analysis
- **High-Temperature Propulsion Materials**—advanced metallic materials, polymers and polymer matrix composites, structural ceramics, and environmental and thermal barrier coatings
- **Propulsion Structures**—analytical, computational, and experimental mechanics; and structural mechanics and dynamics
- **Mechanisms and Mechanical Systems**—seals, gears, health-monitoring, and failure analysis
- **Tribology and Surface Science**—high-temperature solid lubricants and Oil-Free designs for turbines and Brayton-cycle power conversion

Find out more about Glenn's capabilities in our expanded version of this brochure (http://www.grc.nasa.gov/WWW/portal/pdf/center_resume.pdf).

Aeronautics and Space Test Facilities

Detailed descriptions of our 24 major test facilities and over 100 research and development laboratories are available at http://facilities.grc.nasa.gov (in the brochure *Glenn Research Center Test Facilities*) along with information about how to do work in our facilities.

Technology Transfer and Partnerships

We have a long history of successful collaborations. Glenn enters into over 100 Space Act Agreements with many different Government, university, and corporate partners each year. Over 125 Glenn patents are currently available for licensing in power, communications, electric propulsion, combustion, instrumentation, materials, seals, silicon carbide growth, and coatings.

Honors and Awards

Glenn's awards include 98 R&D 100 Awards since 1966, 4 NASA Software of the Year Awards, 2 Collier Trophies (for the greatest U.S. achievement in aeronautics or astronautics for the year), and an Emmy Award. We have reported over 2000 invention disclosures since 1991 and have won an average of nine awards per year from the NASA Inventions and Contributions Board.